



AN OVERVIEW OF GENDER RESEARCH UNDERTAKEN BY RTB CENTERS, 2007-2012

July 2013



**Research
Program on**
Roots, Tubers
and Bananas

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Contents

Introduction	2
Data collection Methods	2
Observations and Findings	3
Findings at RTB level.....	3
Findings at Center Level	5
Lessons learned	6
Recommendations	7
Limitations.....	8
ANNEX 1: Bibliography of Gender Sensitive Research and general research carried out between 2007-2012	9
Gender Sensitive Research 2007-2012.....	9
General research 2007-2012	24
Annex 2: Bibliography of research published before 2007	27
Gender Research	27
General research published before 2007	29
ANNEX 3: List of publication and their gender content	30

Introduction

This overview provides an RTB baseline of gender sensitive research on bananas, cassava, potato, sweetpotato, yam and other root and tuber crops conducted by CIP, Bioversity International, CIAT and IITA between 2007 and 2012. Using publications as a proxy, the review was undertaken to know the extent of gender responsive research, as well as what type of gender research was conducted by the RTB centers during this period. The resultant information is intended to be used in strengthening gender responsive research in the RTB in two ways. First by identifying areas of strength to build upon these and secondly by identifying areas of weakness that may need to be further strengthened in order for RTB to reach its goals as well as to have results that positively impact both men and women.

For the purposes of this review “gender sensitive” research was defined as research which explicitly explores the roles of or impact on women, or both men and women in a situation or activity. From this perspective gender sensitive research, ‘pays attention to the similarities and the differences between men and women’s experiences and viewpoints, and gives equal value to each’ (Leduc, 2009). Thus the review identifies research that addressed the impacts of the RTB research on men and women as well as the research that focuses on the different roles that men and women play within RTB farming systems.

Using various methodologies to collect and review RTB documents and publications, this review found that the amount of research that mention both men and women farmers or women only is slightly above 50% however most of this research does not go further to actually analyse the gender implications of the data. Less than 3% of the publications identified as having a women component or a gender component conduct a gender analysis looking at the impact of RTB’s work on gender relations and women’s empowerment. The majority of the publications reported as gender sensitive simply reported sex disaggregated data without any attempt to further analyse this to understand what the gender implications of the findings are. In addition, there is an imbalance between the centers with some centers having more gender responsive publications/research than others. The recommendations from this review are two fold: 1) there is need to conduct gender sensitive/gender responsive research addressing gender implications and impacts of the work done by RTB; 2) steps should be taken to not only collect sex disaggregated data but also to analyse this data from a gender perspective.

Data collection Methods

The four centers used different methods to collect and gather the documents for review:

IITA conducted a systematic bibliographic search using the online databases or IITA Bibliography (<http://biblio.iita.org/index.php>) as well as the IITA library and Documentation Center Catalog (<http://iita.catalog.cgiar.org>). There also selected entries from the Procite databases and confirmed the presence of a gender dimension by either reviewing the attached document pdf file (if present) or reviewing the full text from online sources. All documents without full texts documents were left out of the review. In the end 71 documents were identified for review. Evaluation reports and conference proceedings were not included in the analysis.

CIAT employed a consultant to interview 19 researchers that had done work on gender to identify documents that could be reviewed; requested CIAT RTB staff to provide relevant documents including technical reports. 9 documents were identified for review.

CIP and Bioversity International sent e-mail requests to staff, asking them to send gender sensitive research that they knew of or had done themselves during the past five years. Using this method CIP and Bioversity identified 18 documents each including reports. All centers used key words to quickly scan documents. The key words included women, men and gender

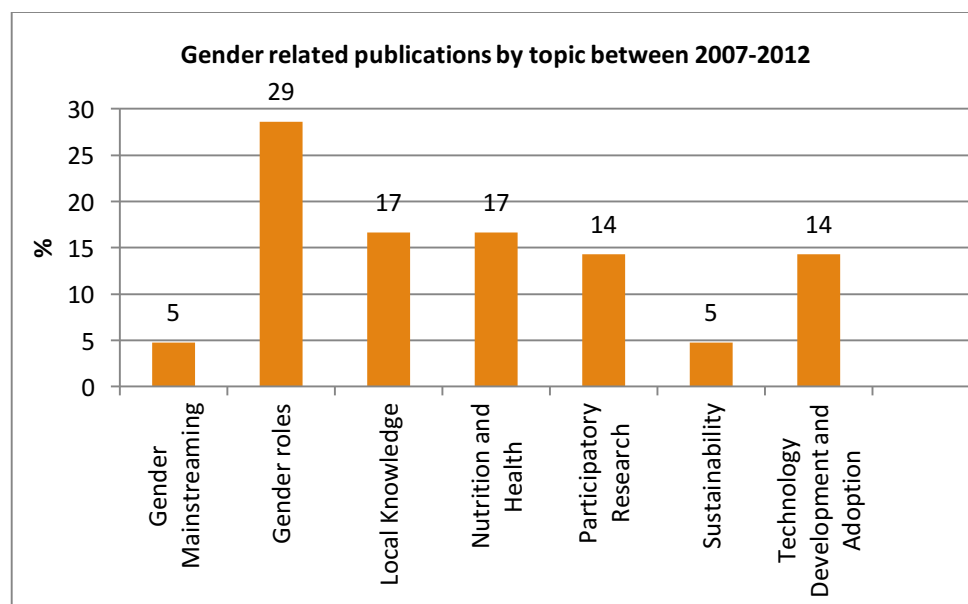
A total of 79 papers published between 2007 and 2012 were reviewed. A further 19 papers published between 1998 and 2006 falling outside the scope of this review were also analysed. These are listed in a separate section in ANNEX I.

Observations and Findings

Findings at RTB level

Using a less strict definition of gender sensitive, out of the 79 papers reviewed, 43 focused mentioned women or mentioned both men and women farmers. Figure 1 below illustrates the distribution of these papers by topic.

Figure 1 Distribution of research mentioninh women or both men and womeb by topic

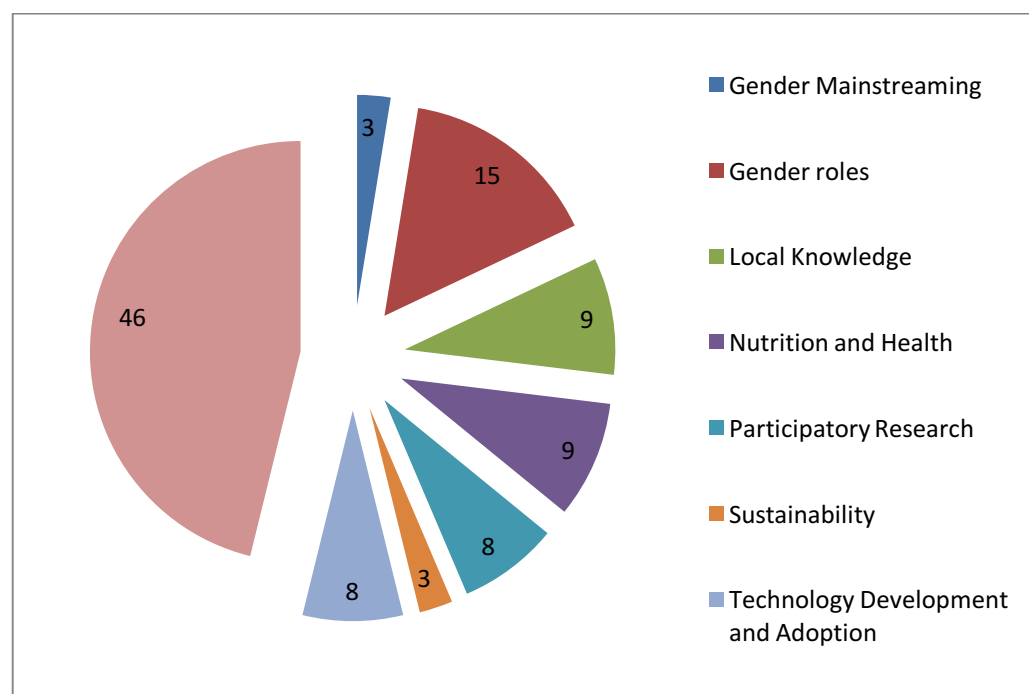


Out of the 43 papers that can be regarded as gender sensitive, a large majority focused on gender roles with a few focusing on gender mainstreaming and sustainability. There was very little or no gender research in other areas of interest to RTB such as Value Chains and Seed systems.

In addition, a closer analysis of these 43 documents that mentioned women or both men and women or gender shows that less than 3% analysed the implications of gender on the work that RTB researchers do or the gender implications and impacts of RTB research and development. Some research included in the 43 publications that mentioned women, both men and women or gender focused only on the situation of women, without providing analysis of the relative situation of men. Thus they are “women only” studies. While it is important to have in-depth information about the situation of women, this does not constitute gender analysis. Gender analysis is used to understand the relationships between men and women, their access to resources, their activities, and the constraints they face relative to each other¹. Thus studying women only will not help RTB to understand this relationship as well as to devise solutions to ensure that both men and women benefit.

Figure 2 below shows the distribution of papers among all reviewed papers (79) by percentage by theme

Figure 2: Percentage of papers focusing on gender/women by theme out of 79 reviewed papers



Many of the studies identified by researchers as having a gender component or as being gender sensitive (in centers where researchers were asked to provide the list), did not address gender issues (see figure 2 above and publications list under general in Annex 1). Work that was seen as benefiting households and or families was regarded as gender sensitive. For example, because of the implicit assumption that higher incomes from agriculture will benefit everyone in the family including women resulted in all work in value chains being listed as gender work regardless of whether this work actually addressed gender issues. Moreover, several articles had no gender component but did have a participatory

¹ <http://www.acdi-cida.gc.ca/acdi-cida/acdi-cida.nsf/eng/JUD-31194519-KBD>

focus therefore some researchers seem to conflate participatory methodologies or participatory activities with gender sensitivity which is not necessarily the case.

Across all centers there is no database for gender publications. This also made it difficult to identify publications with a gender component.

Findings at Center Level

IITA

The bibliographic search covered the years 2000-2012 and found that gender sensitive research tended to be carried out more often after 2006, although a “Sex Disaggregated” dominated. The vast majority of documents that mentioned gender provided only sex disaggregated tables in reported results (See Table 1 in Annex III). Gender related aspects of the studies were difficult to classify from many of the documents, but the vast majority involved only *sex disaggregated* tables in reported results (38; 71%). *Women specific studies* involved 5 (9.4%), and *Women’s Component* and *Gender Integrated* studies 3 (5.7%) each. Three studies could not be classified. Text indicating *Gender mainstreaming* was only encountered in a single study but this interpretation was derived from a brief abstract and hence is somewhat questionable².

IITA Annual Reports from 2000 through 2011 tended initially to mention women as an element of vulnerable groups (along with children, the elderly, and sufferers from HIV) then increasingly addressed the need to reduce the burden of women’s agricultural labour and improve their livelihoods by increasing the productivity of crops and post-harvest processing to improve incomes as well as improving nutritional status. A similar pattern was seen in the IITA Medium Term Plans from 2006-2008 to 2011-2012 with growing recognition of women’s roles in production, and household food security. Starting in the 2006-2008 MTP the principle of equality of opportunity was recognized for access to technology, information services and training.

CIAT

The studies reviewed were primarily biological and did not place much emphasis on social factors (see table 2, Annex III for illustration).

Although some implicit gender sensitivity was evident, there was little explicit consideration of gender issues that may affect the research process or of gendered impacts that could result from the technologies produced. In addition, none of the research reviewed for CIAT for this period focused on the gender implications stemming from the division of labor and cultural norms regulating men’s and women’s behaviours and how this should influence methodology for research involving farmers.

² **Women Specific:** Projects exclusively designed for women **“Women’s Component”:** Projects/activities provide separate resources and activities for women: generally formulated as an “add-on” after regular project planning. **“Gender Integrated”:** Include women on an equal footing with men in all project activities. **“Gender Mainstreamed”:** Awareness of, and commitment to, women’s concerns and priorities infuse all the processes that determine development agendas.

Biodiversity International

The Biodiversity International overview found that while gender was often mentioned in proposals, introductions and objectives, it tended to be overlooked in analysis, results, conclusions and recommendations (please see table 2 Annex III).

CIP

The CIP overview found that there had been an effort to conduct some gender-responsive research and that there were a few excellent studies which demonstrate good understanding of gender and provide data that could easily be used by policy makers (See table 2 Annex III for a list of publications from CIP). The CIP gender studies were divided fairly equally among Latin America/ Asia/ Africa. There is little evidence that the gender work done by CIP builds on other CIP work. It seems to be mostly free standing. Probably a bigger impact would be felt if it fit into a portfolio of CIP work. Few of the gender studies have a focus on policy impact. Most of the gender studies were based on anthropological/ case study approaches. While this approach provides valuable information, it is difficult to scale up from case studies. Finally, only five of the 18 (27 percent) examples of CIP gender work were published papers that presumably went through a peer review process. A further four (22 percent) were book chapters which may or may not have been peer reviewed. Overall about half the gender studies were technical or progress reports with no peer evaluation.

Lessons learned

Below we outline a number of key lessons learnt related to the development of gender sensitive research or work in the RTB-CRP.

- Research that focuses on women is not necessarily gender research. Some researchers equated gender analysis with research that helps women. Although it is important to carry out research that benefit women, gender analysis and gender responsive research is not just about helping women but ensuring that inequality between men and women is reduced in order to benefit the society as a whole. Research has shown the economic benefits of reducing inequality between men and women and the benefits to men, women and children within households.
- Participatory research is not the same as gender research. Participatory research sometimes includes gender analysis but much of the participatory research undertaken by the four centers was not gender sensitive. According to Gurung and Leduc (2009) 'a gender sensitive participatory approach acknowledges the numerous obstacles to women's participation and sets up mechanisms for lifting those obstacles. Particular attention is given to the differential experiences of women and men, and, thus, their different opinions, concerns, needs, and priorities'.³ Although sometimes the research done within the CRP involve participation of men and women, no effort is made to remove or ameliorate gender obstacles to participation or to ensure a feedback loop is maintained between the gender research and basic science.
- Gender should be considered at every step of the research cycle. For example, it should be asked whether local gender relations affect how the research will be carried out or what the outcomes might be. It should also be considered whether outcomes will impact various populations differentially. Thus gender and other characteristics such

³ Gurung and Leduc (2009) Guidelines for a Gender Sensitive Participatory Approach (ICIMOD)

as ethnicity should be considered in the analysis as they may determine who will benefit and who will not from the research we do.

- There is a misunderstanding among researchers of what gender research is with researchers regarding all work that is supposed to benefit households or families as gender research since women are supposed to benefit as part of the family. This presupposes a household where everyone is equal and does not recognise the gendered power relations within households that may make other members of the family benefit from interventions while others may not benefit equally. There has been no attempt to understand what goes on within families and households from a gender perspective.
- Ability to learn from research that has already been done in the different centers is key. At the moment most research is stand alone and no synergies with the body of work on gender currently existing within RTB.

Recommendations

1. There is an urgent need for RTB to consider minimum gender standards in research conducted by RTB. The minimum standards could include all or some of the following issues depending on the type and nature of research:
 - Collection of sex disaggregated data
 - Addressing gender division of labor and labour burdens for men, women and children
 - Sex disaggregated data and analysis of preferences and needs
 - gender relations (power dynamics), particularly relating to decision-making power and control over income
 - Access to resources (e.g. agricultural assets, social networks, information, training) and decision making
 - Mechanisms of diffusion which may be different between men and women
 - community leadership
2. A gender perspective in end user involvement in the research process and a gender perspective in end user benefit from impact of products should be prioritised. .
 - For example, when selecting participants for participatory activities such as PVS selection of participants has to ensure a gender balance (that both men and women are involved)
 - Impact assessments need to include a gender perspective to assess impacts as men and women may be impacted differently by the research we do as well as by interventions. Benefits from the research we do need to be able to meet the needs for gender equity.
 - There is need to understand the constraints to participation for men and women and seek to address these.
3. There is need to build the body of knowledge on gender within RTB. This could involve strengthening the gender content in themes that have already considered some gender aspects as well as conducting gender work and gender analysis in key themes that have been ignored so far such as value chains and seed systems.
4. Gender Capacity Building: The fact that many of the publications submitted as having a gender component did not have a gender component shows that there may be need for researchers to undergo gender training in order to be able to conduct gender

responsive research. Gender training would be useful both for staff and for next/end-users. Workshops could be conducted that would sensitize researchers to reasons for considering gender in their work; familiarize them with concepts and issues; provide opportunity to work with social scientists on integrating gender into their current research; and identify needs for strategic gender research that would support current basic science.

5. Numerous methodological approaches should also be considered. For example, research teams in RTB can tap institutional knowledge – key, long-term staff with extensive field knowledge could be tapped to document critical knowledge such as the division of labor in particular sites.
6. Sentinel sites could be established so that basic social data do not have to be collected anew. Literature reviews can be used to establish typologies of social relations (esp. gender) for particular field sites.
7. Partnerships should be built with key academic institutions to increase capacity to conduct gender research. Finally, research teams should invest in strengthening/building partnerships with organizations that do extension and community development to ensure that research process and outcomes are gender responsive at the least and ideally increasing gender equality.

Limitations

Expect for IITA most of the methods used by the centers were not systematic. The different methods used to identify publications for review may mean that the list of publications is not comprehensive. In addition, other centers may have included analysis of papers before 2007 which fell beyond the scope of this analysis thereby overreporting what had been done. Furthermore, some centers did not include technical reports in the analysis whilst others did. Therefore the data being analysed is not similar across the centres.

ANNEX 1: Bibliography of Gender Sensitive Research and general research carried out between 2007-2012

The bibliographic references below are detailed as submitted by the four CGIAR centers. In some cases, references are incomplete. They have been organized according to a few key categories but allocation into each category has been based mostly on basis of research abstracts. The papers are divided into two major components, those that have a gender component or are gender sensitive and those that are not but were submitted by researchers as having a gender component.

Gender Sensitive Research 2007-2012

Gender mainstreaming

The ECOSOC agreed conclusions 1997/2 defines gender mainstreaming as: "...the process of assessing the implications for women and men of any planned action, including legislation, policies or programmes, in all areas and at all levels. It is a strategy for making women's as well as men's concerns and experiences an integral dimension of the design, implementation, monitoring and evaluation of policies and programmes in all political, economic and societal spheres so that women and men benefit equally and inequality is not perpetuated. The ultimate goal is to achieve gender equality." Gender mainstreaming begins with an assessment of gender differences and inequalities, followed by an assessment of opportunities for interventions. In the CGIAR context, mainstreaming refers to the use of the analysis of gender differences to inform the entire research cycle: targeting, priority setting, research design, implementation, research adoption/ utilisation, monitoring, evaluation and impact assessment with the aim of ensuring that men and women benefit from the work conducted by CGIAR organisations.

1. Mary Njenga, Nancy Karanja, Gordon Prain, Diana Lee-Smith, and Michael Pigeon.
Gender mainstreaming in organisational culture and agricultural research processes.
Development in Practice, Volume 21, Number 3, May 2011.

Abstract: Despite increased attention to gender issues in the international development arena since the rise of feminism in the 1970s, few agricultural research organisations have integrated gender in their problem diagnosis and technology development. Gender mainstreaming can significantly enhance the impact of research and technology development. Entrenching gender mainstreaming in organisations and their research agendas remains a challenge. To overcome it requires political will, accountability, a change in organisational culture, and technical capacity within an organisation. This article presents an illustration of gender-mainstreaming practice in the institutional culture and agricultural research processes by Urban Harvest and the International Potato Centre (CIP).

2. Denis Lucy Avilés, Ivone Antezana, Magaly Salazar o Fausto Yumisaca, Cristina Fonseca Strengthening Gender Mainstreaming and empowerment in the Participatory Market Chain Approach

Gender Roles

Despite the many advances in the development of agricultural technology it has been suggested that the agricultural sector remains the most traditional in terms of gender division

of roles⁴. For example whilst women may be involved in the manually demanding tasks such as weeding, post-harvest processing etc men may be involved in mechanised tasks or task that may demand use of physical strength such as clearing of forest to pave way to agricultural farms. Men usually prepare land, irrigate crops, and harvest and transport produce to market. They own and trade large animals such as cattle, and are responsible for cutting, hauling and selling timber from forests. Women and girls play an important, largely unpaid, role in generating family income, by providing labour for planting, weeding, harvesting and threshing crops, and processing produce for sale. Usually they are responsible for taking care of smaller animals. In most societies rural women have also the primary responsibility for maintaining the household. They raise children, grow and prepare food, manage poultry, and collect fuel wood and water (FAO 2012 <http://www.fao.org/gender/gender-home/gender-why/why-gender/en/>). These gender roles can vary considerably depending on the geographical area, culture and other factors. Because of the gender division of labour, it is important to analyse the work done by both sexes and to recognize that the assets held by male and female farmers are often very different. The research conducted by RTB if taking into account gender considerations has the potential to make the lives of men and women better as well as to alter gender relations existing in society.

1. Akinyemi, S.O.S., C. Staver; I.O.O. Aiyelaagbe, A.A. Kintomo and S.O. Babalola. Perspectives of Small-Scale Musa Processing Firms in Nigeria. *Acta Horticulturae* 879 volume 2 pp 257 – 263. *The International Conference on Banana and Plantain in Africa: Harnessing International Partnerships to increase Research Impact*. Editors: T. Dubois, S. Hauser, C. Staver, D. Coyne (2010). http://www.banana2008.com/cms/details/acta/879_25.pdf

Abstract: Scientists have produced many banana and plantain cultivars that are high yielding and resistant to various pests and diseases. This is likely to continue for many more decades. While looking forward to this, there is a need to know the impact of past efforts on the livelihoods of end users. To this end, a study was designed to analyze the challenges of small-scale rural processing enterprises and the support system, which together will lead to more value from banana and plantain (*Musa* spp.), and greater rural well being. This study was carried out in two phases: the first phase involved visiting and documenting *Musa* products in formal and informal markets. The second phase was done by interviewing different classes of processors and their support service providers using a structured questionnaire, interviews and personal visits to their business environments. The study revealed that processing of *Musa* into different forms and shapes of chips is the most common small *Musa* agro-processing businesses in Nigeria. Other products include flour, soap, 'Dodo Ikire', gin, wine, weaning foods, beer and malt, breakfast cereals and puree. It was further discovered that most small-scale processors do not make use of credit facilities available to them. They keep neither records nor think of expansion. There is a need for them to come together as cooperatives and take advantage of some facilities and services. Different agencies set up to assist them, need more public awareness. It is obvious that *Musa* processing businesses in Nigeria have employed many people regardless of sex and age with chances of absorbing more. They have contributed in many ways to social development. However, with an increasing population, *Musa* producers, processors and scientists still need to stay on the drawing board and be proactive with regards to research for development activities on *Musa*. http://www.banana2008.com/cms/details/acta/879_25.pdf

2. Cadima, Ximena, Franz Terrazas, Magaly Salazar, Rayne Calderón, Ivonne Antezana, Efraín Ajnola, Rhimer Gonzales, Nathalia Ferrufino, Víctor Iriarte.

⁴ Brandth, B. 2001. The gender of Agriculture. Report number 8/2001. Centre for Rural Research. Norwegian University of Science and Technology. <http://www.oecd.org/derec/49558328.pdf>

Preserving biodiversity of Andean roots and tubers: working with women. In Devaux, A., Ordinola, M. and Horton, D. (Eds.) *Innovation for Development: The Papa Andina Experience*. International Potato Center, Lima, Peru (2011) pp 354 – 361 <http://cipotato.org/publications/pdf/005850.pdf>

Abstract: PROINPA, CIP-Papa Andina Initiative, and the Bolivian Ministry of Agriculture have worked together in promoting women's participation in producer associations. These associations seek to increase their members' income through the use and promotion of the biodiversity of Andean roots and tubers, highlighting their nutritional and medicinal properties. Traditional knowledge, especially that of the women, regarding the different uses of roots and tubers such as achira (*Canna edulis*) and arracacha (*Arracacia xanthorrhiza*) was combined with new information on additional uses of such products. Results were presented at several food fairs and other events, thus disseminating the knowledge to other communities. The project has contributed to increasing the income of the whole family, and, in particular, women's income (since they were the ones commercializing the products). It has also contributed to improving women's social capital, including self-esteem and increased recognition from other community members.

3. Conlago, Maria, Fabián Montesdeoca, Magdalena Mayorga, Fausto Yumisaca, Ivonne Antezana, and Jorge Andrade-Piedra. Gender Relationships in Production and Commercialization of Potato Seed with Small-Scale Farmers in the Central Andes of Ecuador. In Devaux, A., Ordinola, M. and Horton, D. (Eds.) *Innovation for Development: The Papa Andina Experience*. International Potato Center, Lima, Peru (2011) pp 346 – 353 <http://cipotato.org/publications/pdf/005850.pdf>

Abstract: A gender analysis was conducted in the central Andes of Ecuador with the following objectives (i) to identify and analyze gender relationships and benefits in potato seed producers of the farmers' organization CONPAPA (Consorcio de la Papa) and (ii) to propose recommendations to improve the relationships among the actors of CONPAPA's seed system. A rural participatory diagnostic with gender approach was used to gather information about general characteristics, participation in community activities, potato-related activities, decision making, and personal, family and unpaid activities. This method promoted reflection among farmers about their roles according to gender. Main conclusions were the following: first, women are a critical component for seed production in CONPAPA; second, women are being empowered by becoming part of CONPAPA seed producer groups; third, becoming part of the CONPAPA seed producer groups might be overloading women's capacity; and fourth, men are still attending the most important events and are in charge of taking the most important decisions. Several recommendations were made. (i) take extra care to use training materials adapted for women and to conduct the training events in their native language; (ii) promote women's access not only to knowledge, but also to other resources, mainly credit, so that they can run their own businesses; (iii) practice affirmative action and promote women's leadership; (iv) be aware that new activities could be overloading women's capacity and, therefore, start the intervention with few and simple activities; and (v) publically recognize the contributions made by women to specific activities.

4. JogoWellington, Eldad Karamura, William Tinzaara, Jerome Kubiriba & Anne Rietveld (2013). Determinants of farm-level adoption of cultural practices for Banana *Xanthomonas* wilt control in Uganda. Submitted to *African Journal for Agricultural and Resource Economics*.

Understanding the factors influencing farmers' adoption decisions of the disseminated Banana *Xanthomonas* wilt (BXW) control package is critical for successful management of the disease. This paper analysed the determinants of farmers' decisions to adopt the control package by smallholder banana farmers in Uganda. A binomial Logit model is applied to household survey data collected from 350 households. Results from the study show that household labour

availability, technology package attributes such as labour demand and perceived effectiveness of the practices in managing the disease; and agro-ecological location and banana production system significantly influence adoption decisions. These results suggest the need for adaptation of the technology package to better suit the needs and socio-economic conditions of smallholder farmers through a farmer participatory technology development approach that takes into account research findings, farmers' indigenous knowledge and resource constraints to enhance adoption.

5. Kleih, U., Phillips, D., Mignouna, D., Ogbonna, D., and Siwoku, D. *Yam Improvement for Income and Food Security in West Africa: Nigeria Scoping Yam Value Chain Analysis*. IITA; 2012.

Abstract: YIIFSWA seeks to double incomes from yam for 3 million smallholder farming families who depend on the crop in West Africa, and contribute to food security for producers and consumers. The project aims to: (1) increase yam productivity (yield and net output) by 40% for 200,000 small-holder yam farmers in Ghana and Nigeria; and (2) deliver key global good research products that will contribute to the ten-year vision of doubling incomes from yams for 3 million small-holder farming families who depend on the crop in West Africa, and (3) contribute to food security for producers and consumers. The CES component of the project is focussed on 'outreach' and will involve the selection and establishment of demonstration plots throughout Nigeria along with training.

6. D. Ochola, W. Jogo, W. Ocimati, A. Rietveld, W. Tinzaara, D.A. Karamura and E. B. Karamura, 2013. Farmers' awareness and perceived benefits of agro-ecological intensification practices in banana systems in Uganda. *African Journal of Biotechnology*, Vol. 12(29), pp. 4603-4613, 17 July, 2013

Abstract: In eastern Africa, banana – a key staple for 20 million people – suffers increasingly from pests and diseases. Population pressure has reduced farmers' ability to access mulch and manure and to rotate crops and fallow fields. This, coupled with the nutrient offtake via increased banana sales, has resulted in declining soil fertility. Few farmers use pesticides and mineral fertilizers due to their high cost and limited availability. Agro-ecological intensification (AEI) harnesses ecological processes to increase productivity of local resources, such as labor, off-farm nutrients and sunlight, to increase production and reduce losses to stresses, while preserving the environment. For effective deployment of AEI, it needs to be adapted for different production systems and conditions of market and input access. Selected on the basis of agro-ecology, production systems and farming objectives homologue sites were evaluated for the incidence of common pests and diseases. Interviews with 60 households in three agro-ecological zones and two banana production systems documented knowledge for applying AEI, including identification of diseases. They also inventoried available resources, including capital, labor and land, as well as irrigation, manure and mulch. Elements of AEI were in use across sites and these varied across agro-ecologies and production systems. Farmers were limited by the lack of knowledge on pest and disease diagnosis, access to inputs (e.g., manure) and resources, including labor and land, to effectively apply AEI practices. Symptoms of *Xanthomonas* wilt and weevils were readily recognized by farmers, while symptoms of other diseases (*Fusarium*, black leaf streak and nematodes) were in most cases either not known or confused. The study concludes that improved farmer knowledge and capacity for ecological reasoning will make more effective the use of current on-farm resources for disease/pest and nutrient cycle management

7. E.B. Karamura, W. Jogo, A. Rietveld, D. Ochola, C. Staver, W. Tinzaara, D.A. Karamura, J. Kubiriba, S. Weise Effectiveness of agro-ecological intensification practices in managing pests in smallholder banana systems in east and central Africa **ISHS Acta**

**Horticulturae 986: International ISHS-ProMusa Symposium on Bananas and Plantains:
Towards Sustainable Global Production and Improved Use**

Abstract: In eastern Africa, banana – a key staple for 20 million people – suffers increasingly from pests and diseases. Population pressure has reduced farmers' ability to access mulch and manure and to rotate crops and fallow fields. This, coupled with the nutrient offtake via increased banana sales, has resulted in declining soil fertility. Few farmers use pesticides and mineral fertilizers due to their high cost and limited availability. Agro-ecological intensification (AEI) harnesses ecological processes to increase productivity of local resources, such as labor, off-farm nutrients and sunlight, to increase production and reduce losses to stresses, while preserving the environment. For effective deployment of AEI, it needs to be adapted for different production systems and conditions of market and input access. Selected on the basis of agro-ecology, production systems and farming objectives homologue sites were evaluated for the incidence of common pests and diseases. Interviews with 60 households in three agro-ecological zones and two banana production systems documented knowledge for applying AEI, including identification of diseases. They also inventoried available resources, including capital, labor and land, as well as irrigation, manure and mulch. Elements of AEI were in use across sites and these varied across agro-ecologies and production systems. Farmers were limited by the lack of knowledge on pest and disease diagnosis, access to inputs (e.g., manure) and resources, including labor and land, to effectively apply AEI practices. Symptoms of *Xanthomonas* wilt and weevils were readily recognized by farmers, while symptoms of other diseases (*Fusarium*, black leaf streak and nematodes) were in most cases either not known or confused. The study concludes that improved farmer knowledge and capacity for ecological reasoning will make more effective the use of current on-farm resources for disease/pest and nutrient cycle management.

8. Udensi, U., Tarawali, G., Favour, E. U., Asumugha, G., Ezedinma, C., Okoye, B. C., Okarter, C., Ilona, P., Okechukwu, R., and Dixon, A. Adoption of selected improved cassava varieties among smallholder farmers in South-Eastern Nigeria. *Journal of Food, Agriculture and Environment* 2011; 9(1):329-335

Abstract: Cassava is a dominant component in crop mixtures in South-Eastern Nigeria. It is a preferred food security crop among smallholder farmers, because it can tolerate drought, low soil fertility and its production requires minimum external inputs. Various constraints have been shown to affect the widespread adoption of improved cassava varieties. This study examines various factors influencing the adoption of selected improved cassava varieties by smallholder farmers in Abia State, Nigeria, using the probit model. A multi-stage random sampling procedure was used to select 510 cassava farmers from 17 Local Government Areas of Abia State in 2007. Results of the study showed that 56.5% of the respondents were females. The majority (90.2%) consisted of those who were in their productive years. Most (78.8%) of the respondents were married, 83% attended formal schools; while 75% had a household size of more than 5 persons. All the respondents were basically small-holder farmers; with 47% full time, 50% of the respondents had secured tenurial arrangements; 93% had more than 6 years of farming experience and 82.2% of them had adopted improved cassava varieties. Results indicated that 74% of 510 farmers who responded adopted improved cassava varieties, either solely or in combination with local varieties. The most popular varieties were NR-8082 (38.6% of total adopters), TME-419 (36.7%) and TMS-980505 (12.9%). Marital status, household size, farm size, cassava maturity period and tenurial status were negatively and significantly related to adoption. Cassava yield and average income had a positive relationship with the adoption of the improved varieties. Implicit in these results is that policies should be aimed at introduction and prompt release of

high yielding and early maturing cassava varieties, and converting tenurial arrangements of land to more secure forms.

9. David, Sonia and Tessy Madu. *A Gender Situation Analysis of Sweetpotato Production in Nigeria: a report on preliminary fieldwork carried out in Nasarawa State*. August 2012. 37pp.
10. Njukwe, E., Onadipe, O. O., Amadou Thierno, D., Hanna, R.; Kirscht, H., Maziya-Dixon, B., Shigeru, A., Mbairanodji, A., and Ngue-Bissa, T. Cassava processing among small-holder farmers in Cameroon: Opportunities and Challenges. *Proceedings of the 2nd Scientific Conference of the Global Cassava Partnership for the 21st Century (GCP21)* Kampala, Uganda. 2012.
11. Onadipe, O., Sanni, L., Alenkhe, B., and Ilona, P. Livelihood enhancement from cassava enterprise: building experience from Benin Republic. Tropical Roots and Tuber Crops and the Challenges of Globalization and Climate Changes. Proceedings of the 11th triennial Symposium of the ISTRC-AB Memling Hotel, Kinshasa, Democratic Republic of Congo . Ibadan, Nigeria; 2012 Feb: 48-54.
12. Sanni, L., Maziya-Dixon, B., Okoruwa, A., Arowosafe, B., Lemchi, J., Ogbe, F., Ezedinma, C., Okechukwu, R., Akoroda, M., Okoro, E., Ilona, P., Babaleye, T., and Dixon, A. *Cassava utilization training for bakers, caterers, and processors in the south-south and southeast of Nigeria*. International Institute of Tropical Agriculture (IITA); 2007.

Local Knowledge

Local knowledge is developed by communities over time and it tends to be dynamic, changing in response to new conditions, e.g. climate change, market demands, etc. The local knowledge of men and women often differs because they have different roles and responsibilities. For example, women are often the traditional managers of seed stocks and they have an in-depth knowledge of local biodiversity, and the use of different wild plants for edible or medicinal purposes. They usually select or conserve seed varieties with the greatest market or use value. Local knowledge also tends to be age-specific. In Gender-sensitive research, it is important to observe and collect data on the local knowledge of both men and women.

1. Badstue, Lone and Rahma Adam. Gender and Vines. *Production, management and exchange of sweetpotato planting material among smallholders in the Lake Victoria region*, Tanzania. Technical Report. August 2011. 35 pp.

Abstract: This document reports on the implementation and findings of a short-term qualitative field study of farmers' practices related to the production and exchange of sweetpotato planting material. The study was carried out in June 2011 in three different communities in the Lake Victoria Region, Tanzania, as part of the Marando Bora project under the CIP-led, multi-partner program Sweetpotato Action for Security and Health in Africa" (SASHA) funded by the Bill and Melinda Gates Foundation.

2. Essono, G. G., Ayodele, M., Foko, J., Akoa, A., and Gockowski, J. Farmers' perceptions of practices and constraints in cassava (*Manihot esculenta* Crantz) chips production in rural Cameroon. *African Journal of Biotechnology*. 2008 Nov; 7(22):4172-4180. Available online at <http://www.academicjournals.org/AJB>

Abstract: A survey aimed at collecting information on practices and constraints in the production of cassava (*Manihot esculenta* Crantz) chips, a transformed cassava product obtained through fermentation and drying of its fresh roots was carried out in 45 villages located in three geographical regions (Yaoundé, Mbalmayo, and Ebolowa) of the humid forest zone of Cameroon. A structured questionnaire to interview farmers was employed. Out of 225 farmers sampled, 212 (94%) relying on chips as food and source of income were women. Overall, 51% of all farmers marketed chips locally. Three distinct forms of chips such as broken pulp (62%), balls (25%), and pellets (13%) were cited as being locally produced by farmers. These were obtained either through air fermentation (cassava pellets), or submerged fermentation (broken pulps and balls), using starters or fermenting agents (31% of responses) or without using them (69%). Chips were mainly home-stored in jute and or/plastic bags (43% of responses), open or closed containers (36%), or on devices hanging over the fireplace (21% of responses) for as long as 180 days. Dark spots or discolouration occurring as a result of chips damage were reported by the majority of respondents (82%) as frequent on cassava chips. These were related to insufficient drying (42%), the use of infected cassava roots by plant pathogenic microbes from the fields (12%), or too long drying of chips under sun light (11% of responses). To avoid dark spots and/or discolouration, 112 farmers out of a total of 185 who were aware about chips damage, practiced sundrying, and 21% of this total dried their chips over the fireplace to control chips damage. Pests and diseases problems (47% of responses), mainly related to the incidence of *Stictococcus vayssierei* Richard (Homoptera: Stictococcidae) and lack of market (26%) were cited by farmers as the most important constraints in cassava chips production. From the results obtained, this study outlined that the potential utilization of cassava and its derived products for industrial purposes is not yet exploited in the locations investigated. Additionally, the study also raised concerns about the safety and hygiene associated with traditionally processed and stored cassava chips in the investigated areas.

3. Mkumbira, J. , Chiwona-Karltun, L. , Lagercrantz, U., Mahungu, N., Saka, J. , Mhone, A. , Bokanga, M. , Brimer, L. , Gullberg, U., and Rosling, H. Classification of cassava into "bitter" and "cool" in Malawi: from farmers' perception to characterization by molecular markers. *Euphytica* 2003

Abstract: Cassava roots, a major food in Africa, contain cyanogenic glucosides that may cause toxic effects. Malawian women farmers considered fields of seemingly similar cassava plants to be mixes of both 'cool' and 'bitter' cultivars. They regard roots from 'cool' cultivars as non-toxic. Roots of 'bitter' were considered to require extensive traditional processing done by women to be safe for consumption. But curiously, these women farmers preferred 'bitter' cultivars since toxicity confers protection against theft, which was a serious threat to the food security of their families. We studied how well these farmers comprehend the effects of genetic variations in cassava when dealing with cyanogenesis in this complex system. Using molecular markers we show that most plants farmers identified as belonging to a particular named cultivar had a genotype typical of that cultivar. Farmers' ethnoclassification into 'cool' and 'bitter' cultivars corresponded to a genetic sub-division of the typical genotypes of the most common cultivars, with four-fold higher cyanogenic glucoside levels in the bitter cultivars. Examining morphology, farmers distinguished genotypes better than did the investigators when using a standard botanical key. Undoubtedly, these women farmers grasp sufficiently the genetic diversity of cassava with regard to cyanogenesis to simultaneously benefit from it and avoid its dangers. Consequently, acyanogenic cassava – the breeding of which is an announced good of some cassava genetic improvement programmes – is not a priority to these farmers. Advances in molecular genetics can help improve food supply in Africa by rapid micropropagation, marker assisted breeding and introduction of transgenic varieties, but can also help to elucidate tropical small-scale farmers' needs and skills.

4. Sindi, Kiriimi and Stella Wambugu. *Going-to-Scale with Sweetpotato Vines Distribution in Tanzania. Marando Bora Baseline Study*. Milestone Report

Abstract: Marando Bora (quality vines) is a sweetpotato seed system project based in the Lake region of Tanzania. The project's purpose is to address the main problems associated with sweetpotato vine availability and distribution by developing a sustainable seed system for sweetpotato. It uses voucher and mass distribution strategies to address these problems. Using decentralized vine multipliers in the communities and mass distribution, the project solves the problem by ensuring timely access to planting vines at the beginning of the rain season. From the analysis, we find that sweetpotato is one of the top four most important crops in the Lake region. It is also considered among the top two crops that farmers rely on for food security together with cassava. The most widely grown variety is Polista. The average production of sweetpotato is about 3.5 tons per ha against a potential of 30 tons. Lack of planting material was identified as a constraint that limits the farmers from planting the crop at the onset of the rains. The survey further finds that households in the Lake region consume sweetpotato regularly and consider it an important part of their diet. However, its consumption reduces with increased income. As incomes increase, a big percentage of the respondents do not serve it to an important visitor. Women play a key role in the production of the crop and are involved in all the activities of production. The most important traits for the farmer when selecting the variety to grow are high yields and resistance to both diseases and drought. On 24-hour recall food diversity, we find that 47% of the households and 53% of the children between 6 and 23 months did not meet the WHO 4 group's minimum food diversity score. Analysis of the 7 days food frequency consumption shows that most of the households did not consume dairy products, eggs, or vegetables at least once a week. About 58% of the households do not meet the WFP food security score. We find that 51% of the households consumed white-fleshed sweetpotato at least once a week, only 2% consumed orange-fleshed sweetpotato. We also find that the wealth index is positively correlated with the sales of crops as well as consumption of food according to the WHO categorization.

5. Benjamin, Margaret, Lone Badstue, Christina Nyhus Dhillon. *Sweetpotato Knowledge, Attitudes and Practices in the Lake Zone, Tanzania*. August 2010. Sasha Milestone Report 3.2.3r. 66 pp.
6. Rietveld et al., Beer-banana value chain in Central Uganda. *Forthcoming CABI / CIALCA banana special issue*.
7. Rietveld et al., Strengthening partnerships along value chains to manage Xanthomonas wilt of bananas in the East & Horn of Africa. *Technical report*

Nutrition and Health

Women contribute to food and nutrition through their roles in agricultural production as well as their roles in food preparation within families. However because of gender inequalities existing in different parts of the world women also face particular risks of under-nutrition, malnutrition, and poor health. Attention to gender issues is crucial at all stages of programming in health, nutrition and agriculture. The CGIAR Research Program on Agriculture for Nutritional Health focuses on gender analysis of needs and exposure to risks; fostering women's participation in and benefits from agriculture, nutrition, and health programs; empowering women and increasing their access to assets; promoting equitable intra-household food allocation and consumption; ensuring gender-friendly technology and delivery systems; and building capacity. In various ways RTB seeks to address food security and nutrition through developing of biofortified varieties (e.g. Orange Fleshed Sweet Potato rich in Vitamin A) or through developing value chains to increase access to incomes for men

and women with the hypothesis that this will result in better nutrition for families as additional income may be used to buy food diversifying people's diets.

1. Arimond, M., C. Hawkes, M.T. Ruel, L.R. Brown, Z. Sifri, P.R. Berti, and E.A. Frongillo, J.L. Leroy, J.W. Low. Agricultural Interventions and Nutrition: Lessons from the Past and New Evidence in B. Thompson and L. Amoroso, eds. *Combating Micronutrient Deficiencies: Food-based Approaches*. FAO 2011. 35 pp.

Abstract: Globally, many poor households rely on agriculture for their livelihoods, and this remains true even when livelihoods are diversified. Poor households are also most vulnerable to undernutrition, including lack of micronutrients. Over the last decades, a variety of organizations have aimed to harness agriculture for nutrition. Agricultural approaches have the potential to substantially impact nutritional outcomes in a sustainable way, but there is insufficient understanding of the evidence base for this potential impact and of how best to achieve this potential. This chapter aims to consolidate the available evidence linking agricultural interventions to nutrition outcomes. First, the chapter describes five pathways through which agricultural interventions can impact nutrition: consumption of own production; increases in income; reductions in market prices; shifts in consumer preferences; and shifts in control of resources. Second, we review four types of studies that provide insights about links between agriculture and nutrition: early studies of agricultural commercialization; studies of women in agriculture; studies of horticultural interventions; and studies of livestock and aquaculture interventions. Consistent themes include the importance of integrating well-designed behaviour-change communications and careful consideration of gender dimensions. Third, we present two case studies that show how well-designed interventions can successfully diversify diets and/or impact micronutrient intakes and nutritional status outcomes; the second case study illustrates impact at scale. The review yields lessons for design of future interventions and for evaluation design, and identifies critical areas for future work, which include investigations of cost-effectiveness, scaling up processes and sustainability.

2. Cole, Donald C., Fadya Orozco T, Willy Pradel, Jovanny Suquillo, Xavier Mera, Aura Chacon, Susitha Wanigaratne, Jessica Leah, Gordon Prain. An agriculture and health inter-sectorial research process to reduce hazardous pesticide health impacts among smallholder farmers in the Andes. *BMC International Health and Human Rights* 2011, 11(Suppl 2):S6 <http://www.biomedcentral.com/1472-698X/11/S2/S6>. Res. Article. 6pp.

Abstract: Methods: We engaged in iterative cycles of mixed methods research around particular questions, actions relevant to stakeholders, new proposal formulation and implementation followed by evaluation of impacts. Capacity building occurred among farmers, technical personnel, and students from multiple disciplines. Involvement of research users occurred throughout: women and men farmers, non-governmental development organizations, Ministries of Health and Agriculture, and, in Ecuador, the National Council on Social Participation.

Results: Pesticide poisonings were more widespread than existing passive surveillance systems would suggest. More diversified, moderately developed agricultural systems had lower pesticide use and better child nutrition. Greater understanding among women of crop management options and more equal household gender relations were associated with reduced farm pesticide use and household pesticide exposure. Involvement in more organic agriculture was associated with greater household food security and food sovereignty. Markets for safer produce supported efforts by smallholder farmers to reduce hazardous pesticide use. Participatory interventions included: promoting greater access to alternative methods and inputs in a store co-sponsored by the municipality; producing less harmful inputs such as compost by women farmers; strengthening farmer organizations around healthier and more sustainable agriculture; marketing safer produce among social sectors; empowering farmers

to act as social monitors; and using social monitoring results to inform decision makers. Uptake by policy makers has included: the Ecuadorian Ministry of Health rolling out pesticide poisoning surveillance modeled on our system; the Ecuadorian Association of Municipalities holding a national virtual forum on healthier agriculture; and the Ecuadorian Ministry of Agriculture promulgating restrictions on highly hazardous pesticides in June 2010.

Conclusion: Work with multiple actors is needed to shift agriculture towards greater sustainability and human health, particularly for vulnerable smallholders

3. Gegios, A., R. Amthor, B. Maziya-Dixon, C.N. Egesi, S. Mallowa, R. Nungo, S. Gichuki, A. Mbanaso, and M. Manary. Children consuming cassava as a staple food are at risk for inadequate zinc, iron, and vitamin A intake. *Plant Foods for Human Nutrition*. 2010.
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2840668/pdf/11130_2010_Article_157.pdf

Abstract: Cassava contains little zinc, iron, and beta-carotene, yet it is the primary staple crop of over 250 million Africans. This study used a 24-hour dietary recall to test the hypothesis that among healthy children aged 2-5 years in Nigeria and Kenya, cassava's contribution to the childrens' daily diets is inversely related to intakes of zinc, iron, and vitamin A. Dietary and demographic data and anthropometric measurements were collected from 449 Kenyan and 793 Nigerian children. Among Kenyan children 89% derived at least 25% of their dietary energy from cassava, while among the Nigerian children 31% derived at least 25% of energy from cassava. Spearman's correlation coefficient between the fraction of dietary energy obtained from cassava and vitamin A intake was $r = -0.15$, $P < 0.0001$, zinc intake was $r = -0.11$, $P < 0.0001$ and iron intake was $r = -0.36$, $P < 0.0001$. In Kenya, 59% of children consumed adequate vitamin A, 22% iron, and 31% zinc. In Nigeria, 17% of children had adequate intake of vitamin A, 57% iron, and 41% zinc. Consumption of cassava is a risk factor for inadequate vitamin A, zinc and/or iron intake.

4. Honfo, F. G., A.P.P. Kayode, O. Coulibaly, and A. Tenkouano. Relative contribution of banana and plantain products to the nutritional requirements for iron, zinc and vitamin A of infants and mothers in Cameroon. *Fruits*. 2007; 62(5):1-11.

Abstract: Introduction. Banana and plantain (ban+plant) play a substantial role in people's diet in Cameroon. A survey was carried out in 240 households in four localities to determine the daily consumption of (ban+plant)-derived foods and the contribution of these foods to iron (Fe), zinc (Zn) and vitamin A intake by children of less than 5 years of age and mothers. Materials and methods. The daily consumption level was assessed by a 24-h dietary recall during three consecutive days. The Fe, Zn and -carotene (precursor of vitamin A) contents of (ban+plant) products were determined and the bioavailability of these micronutrients was estimated using the [phytate:Fe] and [phytate:Zn] molar ratios. *Results:* On a dry-weight basis, Fe content in (ban+plant)-based foods ranged from (0.78 to 1.32) mg·100 g⁻¹; Zn content from (0.22 to 0.41) mg·100 g⁻¹ and -carotene content from (336 to 724) µg·100 g⁻¹. Phytate content was between (0.17 and 1.23) g·100 g⁻¹, with [phytate:Fe] and [phytate:Zn] molar ratios above the estimated bioavailability thresholds of 10-14 and 15, respectively, for all dishes. The daily quantities consumed by rural and urban subjects were not significantly different. The daily supply of Fe by (ban+plant) to children and mothers was 5% and 2%; Zn supply was 3% and 4%, respectively. In contrast, the daily vitamin A supply by (ban+plant) foods was relatively significant, reaching 13% on average per day for both children and mothers. In certain cases, this contribution was as high as 20%. *Conclusion:*

Estimated bioavailability of Fe and Zn is low in (ban+plant) that, therefore, poorly contribute to Fe and Zn intake in the households. However, (ban+plant) are a good source of -carotene and can make a substantial contribution to meeting vitamin A requirements of children and their mothers.

5. Honfo, F. G., A. Tenkouano, and O. Coulibaly. Banana and plantain-based foods consumption by children and mothers in Cameroon and Southern Nigeria: a comparative study. *African Journal of Food Science*. 2011; 5(5):287-291.
<http://www.academicjournals.org/AJFS/PDF/Pdf2011/May/Honfo%20et%20%20al.pdf>

Abstract: Bananas and plantains (*Musa* spp.) play an important role in the diet of people in Central and West Africa. In Cameroon and Southern Nigeria, a comparative study was carried out in 480 households to assess the frequencies and levels of consumption of banana and plantain-based foods commonly consumed by children under five years-old and their mothers. The results revealed some degree of similarities in the areas of boiled, roasted and fried banana or plantain between the two countries. Consumption frequencies of banana and plantain-based foods and consumption levels were higher among the respondents in Cameroon compared to Southern Nigeria surveyed. The daily consumption levels of boiled plantain, fried plantain and ripe banana were 225, 136 and 145 g respectively for children from Cameroon, while in Nigeria, the figure were 112, 82 and 80 g respectively. The daily consumption levels of the same recipes among the Cameroonian mothers were 402, 300 and 304 g respectively whereas among the Nigerian mothers, there were 265, 158 and 165 g. The study showed that banana and plantain-derived food were more consumed in Cameroon than in Southern Nigeria.

6. Muoki, P. N. and B. Maziya-Dixon. Household utilization of Manioc (*Manihot Esculenta* Crantz) in Northern Mozambique. *Ecology of Food and Nutrition*. 2010; 49(5):337-356.

Abstract: Mozambique is ranked ninth of top manioc (*Manihot esculenta* Crantz) producing countries in the world. Manioc roots are a staple to people living in the northern part of the country. Despite this, information on production, utilization, postharvest handling, and marketing is scarce. The purpose of this baseline study was to document selected information on manioc, from the production to marketing stage. To gather this information, 70 focus groups consisting of 1,724 participants purposely sampled from 10 districts were engaged in discussions using a questionnaire. The results show that manioc is the most important crop in terms of contribution to household food security and income in the region. Both men and women participate in the delivery of manioc production chain. Typically, 5 to 15 varieties identified by local language can be found on most farms in the study area. Manioc leaves and roots are the parts of the plant used as human food. Sun dried manioc roots are principally marketed within the locality of production by individual farmers. This baseline study suggests the need for location-targeted interventions as the farmers reported varied challenges along the manioc production chain.

7. Addressing micronutrient deficiencies in Sub-Saharan Africa through Musa-based foods (Harvest+)technical report + scientist pers. Communication.

Participatory Research

The Participatory Research and Gender Analysis Program conducted by RTB centers demonstrate how engaging women farmers in crucial technology design and including decisions related to development of new varieties increases adoption by women farmers.

However, not all participatory research done by researchers within RTB has been gender sensitive. For instance, involvement of men and women in farmer experimentation is not always equitable. In addition, the feedback loop between participatory research and basic science research is not always clear.

1. Awoniyi, O. A., Y.A. Awoyinka, and A.L.K. Kehinde. Effect of the Presidential Initiative on cassava and household food security status in Iwo zone of Osun State Agricultural Development Programme. *African Crop Science Conference Proceedings*. 2009; 9.
2. Campilan, Dindo and Rajindra Ariyabandu with Pratap Shrestha, Raghav Raj Regmi, Carlos Basilio, and Julian Gonsalves. Participatory Development and Research in South Asia in Ronnie Vernooy, ed. *Collaborative Learning in Practice*. IDRC. 2010. 19pp. <http://idl-bnc.idrc.ca/dspace/bitstream/10625/41131/1/129080.pdf>
3. McElhinny, Elaine, Eduardo Peralta, Nelson Mazo'n, Daniel L. Danial, Graham Thiele, Pim Lindhout. Aspects of participatory plant breeding for quinoa in marginal areas of Ecuador. *Euphytica* (2007) 153:373–384 <http://edepot.wur.nl/26552>

Abstract: Field trials were carried out in Ecuador with two indigenous communities, Ninín Cachipata and La Esperanza, to determine farmers preferences for quinoa (*Chenopodium quinoa* Willd.) cultivars and to improve PPB processes. More women than men participated, reflecting that quinoa, a primarily subsistence crop, is mainly managed by women. Farmers field selection criteria for quinoa in the field were mostly based on yield, earliness and plant colour; however only breeders' measurements of yield and panicle height significantly correlated to farmer selection scores. Older women gave higher scores than younger women or men, apparently due to a concept of no cultivar being without value. Working in same gender pairs improved evaluation richness. INIAP technicians were more discriminating in their evaluations than farmers. They also used additional selection criteria of disease resistance and uniformity. At seed selection, farmers from Ninín Cachipata, where food security is not assured, chose lines based on yield, while farmers from La Esperanza, where resources are less limiting, also considered seed size, colour, saponin content and marketability. Field characteristics were not taken into consideration at seed selection, signifying that farmers are less interested in those characteristics, or that it was difficult for them to correlate field data when presented in tabular form with seed characteristics. Future trials with small farmers should have fewer lines or replications to avoid farmer fatigue during evaluation. Farmers who grow primarily for subsistence in semi-arid environments have more interest in growing quinoa, and more to gain from having improved cultivars; therefore, future participatory efforts should focus on them.

4. Ouma, E., J. Jagwe, G.A. Obare, and S. Abele. Determinants of smallholder farmers' participation in banana markets in central Africa: the role of transaction costs. *Agricultural Economics*. 2010; 41(2):111-122.

Abstract: A bivariate probit model was employed to jointly and separately estimate banana market participation decisions of buying and selling households in Rwanda and Burundi using household survey data. Selectivity bias was corrected for estimating the transacted volumes using Heckman's procedure. The results showed that transaction cost-related factors such as geographical location of households, market information sources, and travel time to the nearest urban center influence market participation. Non-price-related factors such as security of land tenure, labor availability, off-farm income, gender of the household head, and years of farming experience had a significant influence on the transacted volumes. Output prices had a significant correlation with sales volume, indicating price incentives increased supply by sellers. Generally, the findings suggest that policies aimed at investments in rural road infrastructure, market information systems, collective marketing,

and value addition of banana products may provide a potential avenue for mitigating transaction costs and enhancing market participation and production of marketed surplus by rural households. Consortium for Improving Agriculture-based Livelihoods in Central-Africa (CIALCA).Burundi, Rwanda, DRC (Kivu north and south).

5. *Marketlink for Sweetpotato. Adaptation of the Participatory Market Chain Approach in the Philippines*
6. *Métodos participativos para la inclusión de los pequeños productores rurales en la innovación agropecuaria: Experiencias y alcances en la región andina 2007 • 2010. Programa alianza cambio andino (CIAT-CIP). 197 pp.*
<http://www.scribd.com/doc/98328160/Metodos-participativos-para-la-inclusion-de-los-pequenos-productores-rurales-en-la-innovacion-agropecuaria-Experiencias-y-alcances-en-la-region-andin>

Sustainable Production

Gender issues are embedded in sustainable production. Women in agriculture and in rural areas have less access than men to productive resources and opportunities. Women do not have equal access to assets, inputs and services they need to be productive and to be efficient in the agricultural sector as well as in other sectors of the economy. This inequitable access imposes costs on the agriculture sector, the broader economy and society as well as on women themselves as it results in underperformance in key economic sectors including agriculture.. If women had the same access to productive resources as men, they could increase yields on their farms by 20–30 percent. This could raise total agricultural output in developing countries by 2.5–4 percent (FAO 2011).

1. Adebayo, K., L. Abayomi, A. Abass, N. Dziedzoave, L. Forsythe, R.J. Hillocks, R. Gensi, R. Gibson, A.J. Graffham, P. Ilona, U.K. Kleih, R.I. Lamboll, G. Mahende, A.M. Martin, G.E. Onumah, A.W. Orr, H. Posthumus, L.O. Sanni, V. Sandifolo, and A. Westby, A. Sustainable inclusion of smallholders in the emerging high quality cassava flour value chains in Africa: challenges for agricultural extension services. *Journal of Agricultural Extension*. 2010 Jun; 14 (1):1-10.

Abstract: Based on the premise that smallholders often get excluded as markets become more commercial, this paper draws lessons from the Cassava: Adding Value for Africa (C:AVA) Project by exploring the main issues and challenges facing extension service partners in five African countries (Nigeria, Ghana, Tanzania, Uganda and Malawi). These lessons includes issues around competitiveness in the supply of raw material, assisting smallholders to produce value-added products competitively, working with a range of partners at different stages in the value chain to take pilot studies to scale, ensuring and maintaining quality, selecting appropriate technologies for different circumstances, anticipating negative effects of the market environment on smallholders and ensuring that strategies for ensuring benefits for women and other disadvantaged groups are incorporated into extension service operations. It concluded that one strategy does not work in all countries and, while positive government support for cassava development is helpful, the real challenge is in the need to target markets according to realisable capacities of the smallholder actors in the value chain.

2. Attaluri, Sreekanth, Janardhan K. V. and Alison Light, eds. *Sustainable sweetpotato production and utilization in Orissa, India. Proceedings of a sweetpotato workshop and training held in Bhubaneswar, Orissa, India*. 17-18 March 2010. 49 pp.

Technology Development and Adoption

Science and technology offers solutions to many challenges faced by rural women living in poverty and provides opportunities for their economic empowerment. These solutions include labour-saving technologies related to women's domestic and productive work such as water pumps and community water schemes, improved cooking technologies, transport of water, wood and crops, post-harvest and food processing. Rural women in most parts of the world continue to be underserved by technologies. Because of women's lower education levels, their lesser access to credit, their lack of land tenure and other discriminatory practices, men are most frequently the beneficiaries of new and improved agricultural technologies. The poorest women continue to use labour-intensive traditional technologies or use no technologies at all. Many new and emerging technologies hold good potential for women's empowerment but not all address gender differences adequately. More thorough analysis is needed about their effects on poor women and men in agriculture.

1. Ironkwe, A., R. Asiedu, and R.P.A. Unamma. Adoption of yam minisett technology by women farmers in Abia State, Nigeria. *Journal of Agriculture and Social Research*. 2007; 7(2):95–105.

Abstract: The study was designed to determine the adoption of yam minisett technology by women farmers in Abia state in 2004. This was with the view to determine how best to accelerate the adoption of the technology in the state. A multistage random sampling technique was used to select 243 yam growing farmers from the three agricultural zone of the State. Interview schedule was used to collect primary data from the respondents. The data was analysed using simple statistics and multiple regression analysis. The level of awareness of the technology was moderately high (58%0 while adoption was low (33%). The major sources of information about the technology were fellow farmers and neighbours. Benefits in forms of increased yield and income were the major rewards accruing from adoption while unavailability of the complimentary inputs and lack of loan and credits were limiting factors to its adoption. Years of farming experience, membership of co-operative/farmers association, income and land ownership were significantly related to adoption. In order to improve the adoption rate the study recommended among other things the need for mobilization of women farmers towards formation and membership of women groups and co-operatives; provision of steady market and good price system for seed yams, more awareness campaigns, provision of complimentary inputs and increasing the number of extension agents to teach the women farmers the technology.

2. Kirscht, H. and E. Njukwe. Dissemination and use of cassava chippers in Cameroon. *Book of Abstracts of CIALCA International Conference on "Challenges and Opportunities for Agricultural Intensification of the Humid-Highland Systems of sub-Saharan Africa*; Kigali, Rwanda. 2011.

Abstract: In 2007 the International Institute of Tropical Agriculture (IITA-Cameroon) and the IFAD funded Roots and Tuber Program of Cameroon (Programme Nationale de Développement des Racines et Tubercules - PNDRT) started to promote and disseminate cassava chipping machines in the main cassava production zones of Cameroon. Beneficiaries of the programme were rural agricultural associations to whom the machines were assigned. They are supposed to store and maintain the chipper and they control the access of their members to the machines. In the regions of action, women account for about two thirds of all members rural agricultural associations. Women are the main cassava producers and transformers in Cameroon and are playing important roles as ordinary members or part of the board.

Together with or preceding the dissemination of the chipping machines, improved cassava varieties, which carry certain resistance against pests and diseases, and therefore allow higher yields, were introduced by IITA and its partners. It was one of the programs targets to especially facilitate the transformation of this improved cassava varieties. It was aimed at producing storable and marketable products with a good price to weight ratio, thus increasing the storage options and reducing costs for transport to the local and regional markets. It was assumed, that particularly women would like to benefit from the chipping machines because of the relatively low labour input necessary for the processing and the small operational costs. Nevertheless, the survey revealed, that men show a considerable interest in the machines, which was reflected in the high number of male beneficiaries in the survey. In 2010 the distribution of the chipping machines was completed and 25 villages received about 100 manual machines, developed by IITA and produced by local fabricators. In addition motor driven machines were delivered to selected villages. This poster presents results of a socio-economic survey about the acceptance of the cassava chipping machines by the local population and the benefits they have brought to the participating village communities.

3. Odebode, S. Rural Women Cassava Processors: Technology and Acumen for Marketing in Nigeria. *Ahfad Journal*. 2008; 25(2):85
<http://globalfoodchainpartnerships.org/india/Papers/Posters/StellaOdebode.pdf>

Abstract: Imperative of technology derives from its ability to serve the users and consumers of its output. This paper attempts to examine the extent to which cassava processed by rural women through improved processing technologies will attract large market as well as exploration of potential constraints. It also describes the relationship between cassava marketing and processing as well as varietal preferences for different cassava products.

Stratified purposive technique was used in selecting 160 participating and 160 nonparticipating women farmers from the six geo-political zones of Nigeria. Data analysis was carried out using frequency counts, percentages, t-test and chi-square. There was a significant relationship between the use of improved cassava processing technologies and marketing of cassava products. A significant difference also exists between the mean adoption sources of participating and non-participating women cassava processors. ($t=6.52$, $P=0.05$). Much (90%) of cassava is processed in remote areas than areas linked with good access roads. The higher the rate of cassava processed, the greater the cassava output marketed. The high level of commercialization recorded was a product of the advanced method of improved cassava processing technology, which adds value to the crops and increases shelf-life. The major problems encountered by women processors in order of severity include shortage of labour, high cost of processing, poor access to market, lack of fund and poor storage facilities. Most respondents recommended the promotion of improved technologies that will be time-saving, access to credit and extension information on farm management.

4. James, B., P. Bramel, E.R. Witte, R. Asiedu, D. Watson, and R. Okechukwu. Expanding the application of cassava value chain technologies through UPOCa project. *African Journal of Root and Tuber Crops*. 2011; 9(1):38-49.
5. Kambewa, E. *Improving rural livelihoods in southern Africa: the SARRNET cassava component; an impact assessment report*. Ibadan, Nigeria. International Institute of Tropical Agriculture (IITA); 2010.
http://www.iita.org/c/document_library/get_file?uuid=64230070-adf3-4283-b1bb-ea285ade285b&groupId=25357

6. Odebode, S. Appropriate Technology for Cassava Processing in Nigeria: User's Point of View. *Journal of International Women's Studies* . 2008; 9(3):269-283.

General research 2007-2012

The papers below address issues related to labour in agriculture, value chains, adoption, local knowledge, technology, nutrition and health, participatory research, sustainable production but does so without reference to gender issues. In some cases there is limited reference to social factors including gender. Farmers are regarded as homogenous and reported results are not reported in a sex disaggregated. The differences between men and women are not investigated.

Technology Development and Adoption

1. Aitchedji, C., A. Tenkouano, and O. Coulibaly. Factors affecting the adoption of disease-resistant plantain and banana (*Musa spp.*) hybrids in Nigeria. *Acta Horticulturae*. 2010 Nov; 2(879):741-748.
2. Information asymmetries and technology adoption: the case of tissue culture bananas in Kenya. Courant Research Centre; Discussion Paper no. 74. .Goettingen, Germany: Georg-August-Universitat, Gottingen, Courant Research Centre; 2011 Mar.
3. Kabunga, N., T. Dubois, and M. Qaim, M. Heterogeneous information exposure and technology adoption: the case of tissue culture bananas in Kenya. *Agricultural Economics*. 2012 Jul; 43(5):473-485.
4. Manyong, V., M. Bamire, and P. Zuckerman. Rural household demand for roots and tubers in southwestern Nigeria: an almost ideal demand system analysis. 13th Symposium of the International Society of Tropical Rptt Crops (ISTRC); International Conference Center, Arusha, Tanzania. 2003.
5. Van Asten, P., L.W.I. Wairegi, F. Bagamba, and C. Drew. Factors driving fertilizer adoption in banana (*Musa spp.*) systems in Uganda. *Acta Horticulturae*. 2010; (879):465-478
6. Faturoti, B., A.E. Agwu, E.M. Igbokwe, and A.Tenkouano. International institute of tropical agriculture plantain and banana programme: an insight into the contributions of farmer-to-farmer extension paradigm. *African Journal of Biotechnology*. 2008 Jul; 7(13):2137-2146.
7. Kawano, Kazuo. *Thirty years of cassava breeding for productivity—Biological and social factors for success*. 2003.
8. Ogunlade, I. and O. Coulibaly. *A proposal for the use of the partnership-extension model to facilitate adoption of the International Institute of Tropical Agriculture's plantain and banana (Musa spp.) technologies in Nigeria*. *Proceedings of the International Conference on Banana and Plantain in Africa: Harnessing International Partnerships to Increase Research Impact; Mombasa, Kenya*. 2010 Nov: 791-796.
9. Peters, D. *Farmer groups, strengthened by Savings and Internal Lending Community, as a delivery channel in the cassava seed system in East and Central Africa*. 2012.
10. Schofield, J. Effectiveness and impacts of training agricultural extension staff at scale - Great Lakes Cassava Initiative (GLCI) *Case Study Number 2*. 2012.

Value Chains

11. Bolton, Michael. *Technical report*. CFC Promotion of Exports of Organic Bananas from Sudan and Ethiopia.
12. Ezedinma, C., I.A. Ojiako, R. Okechukwu, J. Lemchi, A.M. Umar, L. Sanni, M. Akoroda, F. Ogbe, E. Okoro, G. Tarawali, and A. Dixon. *The cassava food commodity*

- market and trade network in Nigeria*. International Institute of Tropical Agriculture (IITA); 2007.
13. Haggblade, S., A. Djurfeldt, D. Nyirenda, J. Lodin, L. Brimer, M. Chiona, M. Chitundu, M., L. Chiwona-Karltun, C. Cuambe, M. Dolislager, C. Donovan, K. Droppelmann, M. Jirstrom, E. Kambewa, P. Kambewa, N. Mahungu, J. Mkumbira, J. Mudema, H. Nielson, M. Nyembe, V. Salegua, A. Tomo, and M. Weber. Cassava commercialization in Southeastern Africa. *Journal of Agribusiness in Developing and Emerging Economies*. 2012; 2(1):4-40.
 14. Improving small farm production and marketing of bananas under trees. *Annual report 2010*
 15. Improving small farm production and marketing of bananas under trees: Resource partitioning, living soils, cultivar choice & marketing strategies. Costa Rica, Nicaragua, Honduras and Peru. *Annual technical progress report*.
 16. Kambewa, E. and N. Mahungu. *Cassava production and marketing in the Chinyanja triangle (Malawi, Mozambique & Zambia), Angola and South Africa*. International Institute of Tropical Agriculture/ Southern Africa Root Crops Research Network (IITA/SARRNET); 2007.
 17. Kabunga, N., T. Dubois, and M. Qaim. *Impact of tissue culture banana technology on farm household income and food security in Kenya*. Goettingen, Germany: Georg-August-Universität, Göttingen, Courant Research Centre.; 2011 Aug; 89.
 18. Mgenzi, S.R.B., I.M. Mshaghuley, C. Staver and J.M. Nkuba. Banana (Musa spp.) Processing Businesses: Support Environment and Role in Poverty Reduction in Rural Tanzania. *Technical report*
 19. Sanni, L., C. Ezedinma, R. Okechukwu, J. Lemchi, F. Ogbe, M. Akoroda, E. Okoro, B. Maziya-Dixon, P. Ilona, and A. Dixon. *Cassava postharvest needs assessment survey in Nigeria*. Ibadan, Nigeria: International Institute of Tropical Agriculture (IITA); 2007.
 20. Sanni, L., O.O. Onadipe, P. Ilona, M. Davis-Mussagy, M., A. Abass, and A. Dixon. *Successes and challenges of cassava enterprises in West Africa: a case study of Nigeria, Benin and Sierra Leone*. International Institute of Tropical Agriculture (IITA); 2009
 21. Staver, Charles. *Growing bananas with trees and livestock: young farmer business groups improve crop and natural resource health and market links for rural well-being*.
 22. Staver, C. et al., *Musa Processing Businesses – Their Contribution to Rural Development* Publication: summary of results for different countries

General - unclassified

23. Australian Government. *Partners for Research in Development. Focus on Africa*. 2010. 4pp
24. Bongers, G., L. Jassogne, I. Wanyama, A. Nibasumba, D. Mukasa and P. Van Asten. Understanding and exploring the evolution of coffee-banana farming systems in Uganda. *Proceedings of the 10th European International Farming Systems Association (IFSA) Symposium, "Producing and reproducing farming systems: New modes of organisation for sustainable food systems of tomorrow"*, Aarhus, Denmark. 2012 Jul.
25. Campilan, Dindo, Arma Bertuso, Wayne Nelles, and Ronnie Vernooy eds. *Using Evaluation for Capacity Development. Community-Based Natural Resource Management in Asia*. IDRC/ CIP 2009.
26. Catholic Relief Services. *Final Report on the Great Lakes Cassava Initiative*. Catholic Relief Services; 2012.

27. A.L. Chavez, T. Sanchez, H. Ceballos, D.B. Rodriguez-Amaya, P. Nestel, J. Tohme, and M. Ishitani. *Retention of carotenoids in cassava roots submitted to different processing methods*. 2007.
28. Herrera Campo, B., G. Hyman, and A. Bellotti *Threats to cassava production: known and potential geographic distribution of four key biotic constraints*. 2011.
29. Informe de seguimiento técnico anual de la ejecución del proyecto 2011-2012. República Dominicana, Venezuela. *Annual technical progress report*.
30. Informe de seguimiento técnico anual de la ejecución del proyecto 2010-2011 Panamá, Nicaragua, República Dominicana, Venezuela. *Annual technical progress report*.
31. Jassogne, L., P. Van Asten, I. Wanyama, P. and Baret. Perceptions and outlook on intercropping coffee with banana as an opportunity for smallholder coffee farmers in Uganda. *International Journal of Agricultural Sustainability*. 2012; 1-15.
32. Ntawuruhunga, P., J. Legg, J. Okidi, G. Okao-Okuja, G. Tadu, and T. Remington. *Southern Sudan, Equatoria region, cassava baseline survey technical report*. International Institute of Tropical Agriculture (IITA); 2007.
33. Rietveld et al., Targeting young adults/young households in Central Uganda: Where is the next generation of farmers? *Uganda Conference proceeding*
34. Sanogo, D. and A. Olanrewaju. *Presidential initiatives on cassava in Africa: case studies of Ghana and Nigeria*. International Institute of Tropical Agriculture (IITA); NEPAD; 2008.
35. Tin Maung, Aye. *Cassava Agronomy: Land preparation, time and method of planting and harvest, plant spacing and weed control*.
36. Vézina, Anne and Richard Markham. *Who needs GM bananas? And will they have the chance to choose?*

Annex 2: Bibliography of research published before 2007

Gender Research

The papers listed in this Annex were not included in analysis for this report except for table 1 in Annex 3 reporting IITA gender analysis of its published papers.

Gender roles

1. Enete, A., Nweke, F., Achike, A. I., and Tollens, E. F. Differentiated gender ownership of cassava fields and implications for root yield variations in small holder agriculture of southeast Nigeria. *Tropicultura* 2001; 19(3):105-109.
<http://www.tropicultura.org/text/v19n3/105.pdf>

Abstract: As a result of their relatively limited access to production resources, it has been variously reported that women obtain lower yield from their individual crop fields than men. Cassava root yields obtained from farmers' fields in three villages of southeast Nigeria were compared using separate ownership of fields by gender as a factor. The results of the analysis fail to confirm lower yields on women's fields. Instead, mean fresh root yield was lower for fields owned individually by men than those owned individually by women, and about the same for fields owned jointly by the whole family and those owned individually by women. This was apparently because of differences in the use of purchased inputs, especially hired labor and improved cassava varieties, and perhaps also due to differences in the age of cassava at harvest and the intercropping of cassava as a minor crop with yam.

2. Tshiunza, M., Lemchi, J., and Tenkouano, A. . Determinants of market production of cooking banana in Nigeria. *African Crop Science Journal*. 2001; 9(3):537-547.

Abstract: The factors that influence farmers' decisions to produce cooking banana for market in southeast Nigeria were examined. Data were collected from a random sample of 217 farmers through the use of a structured questionnaire. Results of the study indicated that about 80% of the farmers interviewed produce cooking banana both for household consumption and for sale. The proportion of cooking banana sold ranged from 10% to 90% with an average of 45%. Thus, cooking banana performs the dual role of providing food for the households, as well as being an additional source of cash income. Tobit regression analysis revealed that the price and the ripening stage at sale of cooking banana, as well as the presence of middlemen in the marketing chain were the most important determinants of the proportion of cooking banana planted for market. This indicates that cooking banana growers readily

3. Enete, A., Nweke, F., and Tollens, E. F. Contributions of men and women to food crop production labour in Africa: information from COSCA. **Outlook on Agriculture** 2002; 31(4):259-265.

Abstract: It is widely reported that women provide the bulk of food production labour in Africa. Since efficient targeting of improved technologies demands an understanding of who is likely to use them, and new farm technologies have often been inappropriate for women's needs, this paper presents the relative contributions of men and women to food production labour in six major cassava-producing countries of Africa. The paper is based on farm-level information collected within the framework of the Collaborative Study of Cassava in Africa (COSCA). While the number of fields in which women provided more labour for each farm task increased consistently from the initial farm operations, such as land clearing and seedbed preparation, through sowing (planting) and weeding to the final farm operations such as

harvesting and transportation, for which women provided more labour for the largest number of fields, the reverse was the case for men. The relative number of households where females provided more field labour than males was higher among female-headed households than among male-headed ones. Such households were characterized by a lower working age male/female ratio, and/or were engaged in tree crop production, which often absorbed male labour. Villages where females provided more field labour than males were more common in remote areas where access to markets was poor and population density sparse, or in countries where men had fled the villages because of political repression. Such villages were also more common among non-Muslim communities than among predominantly Muslim societies. On the whole, however, men contributed more labour in significantly more fields than women in most places. These observations suggest that it could be misleading to generalize that women are providing the bulk of food production labour across Africa. They provide clear evidence of gender division of labour on the farm, and help to explain gender bias in agricultural extension efforts in Africa. Recommendations that pre-harvest extension activities should be mainly directed at women have hardly been heeded. It is recommended that these activities should be targeted at both men and women, but more towards women where men have fled the villages for political reasons or for commercial ones such as poor market access opportunities. Age and gender ownership of cooking bananas also influenced the proportion of the crop planted for market. Increased involvement of wholesalers and processors in the marketing chain of the crop will probably enhance its market in the región

4. Ironkwe, A., Unamma, R. P. A., and Asiedu, R. Involvement of women farmers in seed yam production in Abia state, Nigeria: Asumugha, G., Olojede, A. O., Ikeorgu, J., Ano, A. O., and Herbert, U. Repositioning agriculture for sustainable millennium development goals in Nigeria: proceedings of the 40th annual conference ; National Root Crops Research Institute, Umudike, Abia State. Umudike, Nigeria: Agricultural Society of Nigeria; 2006 Oct: 610-614

Local Knowledge

1. Tapia, Mario E. and Ana De la Torre. *Women Farmers and Andean Seeds*. Rome: FAO, Food and Agriculture Organization of the United Nations and IPGRI, International Plant Genetic Resources Institute. 1998.46 pp. (LOCAL KNOWLEDGE) This Series is a key means to generate and disseminate knowledge to bring gender perspectives into the mainstream of agrobiodiversity conservation and use. http://www.bioversityinternational.org/fileadmin/bioversity/publications/pdfs/308_Women_farmers_and_Andean_seeds.pdf?cache=1371921755

Participatory Research

1. Dalton, T., N. Lilja, N. Johnson, and R. Howeler *Impact of Participatory Natural Resource Management Research in Cassava-Based Cropping Systems in Vietnam and Thailand*. 2005. http://ciat-library.ciat.cgiar.org/Articulos_Ciat/SPIA%20book%20chapter-CIAT-PRGA.pdf

Technology Development and adoption

2. Ironkwe, A, R. Asiedu, and K. Ekwe. Socio-economic determinants of adoption of yam miniset technology by women farmers in Abia State of Nigeria. *Journal of Research in Agriculture*. 2006; 3(4):1-7.

Nutrition and Health

1. Ekesa Beatrice. CIALCA Technical Guide O2. Improving Nutrition and Health Through Sustainable Agricultural Interventions. Bioversity International (no date)<http://www.cialca.org/files/files/CIALCA%20Technical%20guide%202002-English.pdf>

General research published before 2007

1. Schill, P., K. Afreh-Nuamah, C. Gold, and K. Green. Farmers perceptions of constraints to plantain production in Ghana. *International Journal of Sustainable Development and World Ecology*. 2000; 71-13.
2. Nweke, F., D. Lutete, B. Ugwu, O. Ajobo, N. Kalombo, B. Bukaka, and A. Dixon. *Cassava production and processing in the Democratic Republic of Congo*. Ibadan, Nigeria: IITA & COSCA; 2000.
3. Manyong, V., A. Dixon, K. Makinde, M. Bokanga, and J. Whyte. *The contribution of IITA-improved cassava to food security in sub-Saharan Africa: an impact study*. International Institute of Tropical Agriculture (IITA); 2000.
4. Tsegai, D. and P. Kormawa. Determinants of urban household demand for cassava and cassava products in Kaduna, northern Nigeria: *Paper presented. Deutscher Tropenta; Witzenhausen, Germany*. 2002.
5. IITA. *Preemptive management of the virulent cassava mosaic disease in Nigeria. Annual report July 2003 to June 2004*. Ibadan, Nigeria. IITA ; 2005.
6. Moyo, C., I. Benesi, F. Chipungu, C. Nwale, V. Sandifolo, and N. Mahungu. Cassava and sweetpotato yield assessment in Malawi. *African Crop Science Journal*. 2004; 12(3):295–303.
7. Sanusi, R., V. Manyong, I. Akinyele, I., A. Bamire, and A. Oginni. Food consumption pattern and household food insecurity in two communities in Ibadan, Oyo State. Nigeria. *European Journal of Scientific Research*. 2005
8. Lemchi, J., M. Tshiunza, U.P. Onyeka, and A. Tenkouano. Factors driving the adoption of cooking banana processing and utilisation methods in Nigeria. *African Journal of Biotechnology*. 2005; 4(11).
9. *Cassava Enterprise Development Project. Additional Funding Program Description*. 2005.
10. Faturoti, B., G. Emah, B. Isife, A. Tenkouano, and J. Lemchi. Prospects and determinants of adoption of IITA plantain and banana based technologies in three Niger Delta States of Nigeria. *African Journal of Biotechnology*. 2006; 5(14):1319–1323.

ANNEX 3: List of publications and their gender content

Table 1: Gender analysis of IITA's publications from 1998 to 2012

Nature of Gender Element	Cassava	Cassava %	Banana	Banana %	Yam	Yam %
Sex disaggregated	27	79.4	9	81.8	2	40.0
Women specific	2	5.9	2	18.2	1	20.0
Women's component	1	2.9	0	0.0	2	40.0
Gender Integrated	3	8.8	0	0.0	0	0.0
Gender Mainstreamed	1	2.9	0	0.0	0	0.0
Total	34	100.0	11	100.0	5	100.0

Table 2: Gender analysis of CIP, CIAT and Bioversity's publications

Title and author	Type of Gender dimension	Summary of gender conclusions
CIAT		
1. Dalton, T., N. Lilja, N. Johnson, and R. Howeler <i>Impact of Participatory Natural Resource Management Research in Cassava-Based Cropping Systems in Vietnam and Thailand</i> . 2005. http://ciat-library.ciat.cgiar.org/Articulos_Ciat/SPIA%20book%20chapter-CIAT-PRGA.pdf	Participatory not gender analysis	Minimal. No discussion of implications
2. A.L. Chavez, T. Sanchez, H. Ceballos, D.B. Rodriguez-Amaya, P. Nestel, J. Tohme, and M. Ishitani. <i>Retention of carotenoids in cassava roots submitted to different processing methods</i> . 2007.	None	None

Title and author	Type of Gender dimension	Summary of gender conclusions
3. Kawano, Kazuo. <i>Thirty years of cassava breeding for productivity—Biological and social factors for success</i> . 2003.	None	None
4. Herrera Campo et al. 2011 Herrera Campo,B, G. Hyman, and A. Bellotti <i>Threats to cassava production: known and potential geographic distribution of four key biotic constraints</i> . 2011	None	None
5. Tin Maung, Aye. <i>Cassava Agronomy: Land preparation, time and method of planting and harvest, plant spacing and weed control</i> .	None	None
CIP		
6. Mary Njenga, Nancy Karanja, Gordon Prain, Diana Lee-Smith, and Michael Pigeon. Gender mainstreaming in organisational culture and agricultural research processes. <i>Development in Practice, Volume 21, Number 3</i> , May 2011.	Gender analysis	Yes. Conclusions on gender mainstreaming in institutional culture and research practices by Urban Harvest and CIP
7. Cadima, Ximena, Franz Terrazas, Magaly Salazar, Rayne Calderón, Ivonne Antezana, Efraín Ajnota, Rhimer Gonzales, Nathalia Ferrufino, Víctor Iriarte. Preserving biodiversity of Andean roots and tubers: working with women. In Devaux, A., Ordinola, M. and Horton, D. (Eds.) <i>Innovation for Development: The Papa Andina Experience</i> . International Potato Center, Lima, Peru (2011) pp 354 – 361 http://cipotato.org/publications/pdf/005850.pdf	Women participation in producer associations focusing on knowledge dissemination on different uses of Roots and Tubers including nutritional and medicinal properties.	Yes. Focusing on women's improvement in social capital, incomes and self esteem
8. Conlago, Maria, Fabián Montesdeoca, Magdalena Mayorga, Fausto Yumisaca, Ivonne Antezana, and Jorge Andrade-Piedra. Gender Relationships in Production and Commercialization of Potato Seed with Small-Scale Farmers in the Central Andes of	Yes. Participatory gender analysis of seed gender relations in seed producer organisations, focusing on gender and decision making , participation etc	Yes. Conclusions on efficiency arguments of including women, adapting training material to women's

Title and author	Type of Gender dimension	Summary of gender conclusions
Ecuador. In Devaux, A., Ordinola, M. and Horton, D. (Eds.) <i>Innovation for Development: The Papa Andina Experience</i> . International Potato Center, Lima, Peru (2011) pp 346 – 353 http://cipotato.org/publications/pdf/005850.pdf		needs, promotion of women in leadership and accounting for additional labour burdens on women
9. Badstue, Lone and Rahma Adam. <i>Gender and Vines. Production, management and exchange of sweetpotato planting material among smallholders in the Lake Victoria region, Tanzania</i> . Technical Report. August 2011. 35 pp.	Yes. Assess the role of women sweet potato seed system.	Yes. Makes specific conclusions and recommendation about women's roles and involvement in vine systems
10. Sindi, Kirimi and Stella Wambugu. <i>Going-to-Scale with Sweetpotato Vines Distribution in Tanzania. Marando Bora Baseline Study</i> . Milestone Report OB3BMS2.1C1. February 2012. 49 pp http://sweetpotatoknowledge.org/projects-initiatives/reaching-agents-of-change-rac/marando-bora-baseline-study.pdf	None. No gender dimension except for a single mention about the important role women play in crop production activities.	None.
11. Cole, Donald C., Fadya Orozco T, Willy Pradel, Jovanny Suquillo, Xavier Mera, Aura Chacon, Susitha Wanigaratne, Jessica Leah, Gordon Prain. An agriculture and health inter-sectorial research process to reduce hazardous pesticide health impacts among smallholder farmers in the Andes. <i>BMC International Health and Human Rights 2011, 11(Suppl 2):S6</i> http://www.biomedcentral.com/1472-698X/11/S2/S6 . Res. Article. 6pp.	Yes. Discuss issues of unequal gender relations on relation to use of pesticide and impact on health	None. Gender issues not highlighted in the conclusion
12. McElhinny, Elaine, Eduardo Peralta, Nelson Mazo'n, Daniel L. Danial, Graham Thiele, Pim Lindhout. Aspects of participatory plant breeding for quinoa in marginal areas of Ecuador. <i>Euphytica</i> (2007) 153:373–384. http://edepot.wur.nl/26552	YES. Women participation. Involvement of women in terms of numbers. Provision of numbers and sex disaggregated data	None. Gender issues not raised or discussed in the conclusion

Title and author	Type of Gender dimension	Summary of gender conclusions
13. Attaluri, Sreekanth, Janardhan K. V. and Alison Light, eds. <i>Sustainable sweetpotato production and utilization in Orissa, India. Proceedings of a sweetpotato workshop and training held in Bhubaneswar, Orissa, India.</i> 17-18 March 2010. 49 pp. http://sweetpotatoknowledge.org/sweetpotato-introduction/sreekanth-attaluri-sweetpotato-book-orissa-india	Yes involvement of women in the workshop as well as the focus on nutrition	None. Conclusions of workshop report not too specific on gender issues.
14. Campilan, Dindo and Rajindra Ariyabandu with Pratap Shrestha, Raghav Raj Regmi, Carlos Basilio, and Julian Gonsalves. <i>Participatory Development and Research in South Asia</i> in Ronnie Vernooy, ed. <i>Collaborative Learning in Practice</i> . IDRC. 2010. 19pp. http://idl-bnc.idrc.ca/dspace/bitstream/10625/41131/1/129080.pdf	Minimal. Mentioning % of women attending the trainings as well as gender sensitive methods to enable women to participate in training (e.g. allowing them to bring children)	None. No discussion of gender implications of using PD&R methods or of how gender issues can affect the effectiveness of these methods.
Bioversity		
15. Mitú Area et al.	Yes. Gender preferences, gender division of labour, women participation in discussions	Yes. Discussed gender implications
16. . Perez et al. 2011	Somewhat. Mentions women's role in peeling cassava	None
17. Saberes y Sabores et al, 2008	Somewhat. Discusses women's preferences for Banana varieties	None, Implications of gender preferences not discussed.
18. Michael. <i>Technical report</i> . CFC Promotion of Exports of Organic Bananas from Sudan and Ethiopia.	None	Gender not mentioned

Title and author	Type of Gender dimension	Summary of gender conclusions
19. Charles. <i>Growing bananas with trees and livestock: young farmer business groups improve crop and natural resource health and market links for rural well-being</i>	Participatory approach; equal inclusion of men and women in participation and experimentation.	No gender differentiated analysis.
20. C. Staver et al., <i>Musa Processing Businesses – Their Contribution to Rural Development summary of results for different countries</i>	None	None. No gender differentiation
21. Vézina, Anne and Richard Markham. <i>Who needs GM bananas? And will they have the chance to choose?</i>	None. Access to external inputs is discussed but no mention of women	None
22. Rietveld et al., <i>Beer-banana value chain in Central Uganda. Forthcoming CABI / CIALCA banana special issue.</i> 1.	Medium Male and female actors surveyed; most results gender differentiated; analysis somewhat gender responsive.	None. Gender doesn't come back in discussion and conclusion
23. Rietveld et al <i>Strengthening partnerships along value chains to manage Xanthomonas wilt of bananas in the East & Horn of Africa. Technical report</i>	Somewhat. Baseline data gender differentiated	None

Title and author	Type of Gender dimension	Summary of gender conclusions
24. Ocholi et al.,	Somewhat Different production objectives for men and women discussed, data gender differentiated	Somewhat: Women have smaller landholdings; more concerned with food production; have less decision-making power; Make more use of AEI practises
25. Jogo et al.,	Somewhat. Data sex disaggregated	None
26.	Participatory approaches	Modest. Specific reference is made to the general gender blindness of PRAs where community often only entail the male community. No attention is paid to gender biases in the PRA methodology described in the report. In the description of farm systems in the different mandate areas gender differences in crop management are emphasized.

Title and author	Type of Gender dimension	Summary of gender conclusions
27.	Somewhat. emphasis on women needs; not on gender	None
28.	none	None. In the progress technical report of 2010 it is acknowledge that gender should be higher on the research agenda, no further notice is made.
29.	Somewhat. Women target group	None. Although targeting women and children and also involving men no proof of a sound gender-approach or theory was found however.
30. S.R.B. Mgenzi, I.M. Mshaghuley, C. Staver and J.M. Nkuba1 Banana (Musa spp.) Processing Businesses: Support Environment and Role in Poverty Reduction in Rural Tanzania. <i>Technical report</i>	None	None. No mention of gender/women
31. S.O.S. Akinyemi, C. Staver; I.O.O. Aiyelaagbe, A.A. Kintomo1 and S.O. Babalola Perspectives of Small-Scale Musa Processing Firms in Nigeria. Acta Horticulturae 879 volume 2 pp 257 – 263. <i>The International Conference on Banana and Plantain in Africa: Harnessing International Partnerships to increase Research Impact</i> . Editors: T. Dubois, S.	Woman roles in VC	Somewhat. Some mention of gender differentiated roles in the VC

Title and author	Type of Gender dimension	Summary of gender conclusions
Hauser, C. Staver, D. Coyne (2010). http://www.banana2008.com/cms/details/acta/879_25.pdf		
32.	None. The gender variable is not analyzed	Somewhat. The paper reports that. Overall, women have had a 14% participation in those meetings, but there is no specific action to encourage their participation.
33.	None. The gender variable is not analyzed	None. In objective "3. Investigate and innovate business processes organization for smallholder banana producers", it mentions men and women, but gender differentiation does not result in any analysis or specific action, so there is a gender analysis in the project.

Title and author	Type of Gender dimension	Summary of gender conclusions
34.	None. The gender variable is not analyzed	None. Although in two instances it mentioned activities done by women in processing and value addition of Banana and the recognition of the important role women play There is no gender analysis.
35.	The gender variable is not analyzed	None although the document focuses on citizen participation which is highly gendered.